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ABSTRACT

Many researchers now believe that the representations and processes underlying syntactical development are specific to a "language faculty." If so, reference animacy would not be expected to influence acquisition of linguistic structures such as the passive sentence construction. Specifically, children should be comparably able to acquire the passive sentence construction from animate (A) patient instances (e.g., "the baby was picked up by the clown") and static inanimate (SI) patient instances (e.g., "the book was picked up by the clown"). After tests for comprehension of semantically reversible passives, 52 children aged 2.6 to 4.8 years repeated a passive sentence description of A-patient drawings; 51 children aged 2.10 to 5.3 years received descriptions of SI-patient drawings. In post-teaching, all described animate agent drawings, counterbalanced for animate and inanimate patients. Then 45 A-patient and 45 SI-patient children were retested for comprehension. Mean comprehension increased significantly only in A-patient children. Also, more A-patient children than SI-patient children "knew" word order relations for passives in post-teaching production tests. Findings indicate that the conceptual distinctions that children make between animate and inanimate beings can constrain language learning, and imply that language acquisition can not be fully understood in terms of the functioning of a purportedly language-specific faculty. (Author/MSE)

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Animacy constraints on acquisition of the passive: Evidence from comprehension after production training with animate vs. inanimate patients

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Abstract

Many researchers now believe that the representations and processes underlying syntactical development are specific to a "language faculty". If so, referent animacy would not be expected to influence acquisition of linguistic structures such as the passive sentence construction. Specifically, children should be comparably able to acquire the passive sentence construction from animate (A) patient instances (*The baby was picked up by the clown*) and from static inanimate (SI) patient instances (*The book was picked up by the clown*).

After tests for comprehension of semantically reversible passives, 52 children ages 2-6 to 4-8 years (mean, 3-7; mean comprehension, 42%) repeated passive sentence description of A-patient drawings; 51 children 2-10 to 5-3 years (mean, 3-8, mean comprehension, 42%) received descriptions of SI-patient drawings. In post-teaching, all described animate agent drawings, counterbalanced for animate and inanimate patients. Then 45 A-Patient and 45 SI-Patient children were retested for comprehension.

Mean comprehension increased significantly only in A-Patient children. Also, more A-Patient than SI-Patient children "knew" word order relations for passives in post-teaching production tests. These findings indicate that the conceptual distinctions that children make between animate and inanimate beings can constrain language learning, and imply that languaage acquisition cannot be fully understood in terms of the functioning of a purportedly language-specific "faculty".

Animacy constraints on acquisition of the passive: Evidence from comprehension after production training with animate vs. inanimate patients.

In full passive sentences such as *The kitten was hit by the puppy*, the patient (*kitten*) functions as the subject, and the agent (*puppy*) is demoted to the by-phrase. Many researchers currently believe that innate, language-specific principles and mental computations underlie acquisition of the construction. However, there are some disputes among proponents of this view as to when these procedures become available to children.

Borer & Wexler (1987) presented a maturational account which holds that the details of the development of the "language faculty" and the timing of this development are controlled by an underlying biological program. They hold that the linguistic principles of the language faculty mature at different rates and that a critical principle that is essential for passivization is not available to young children. According to Borer & Wexler, young children can generate "adjectival passives" such as *The toy is broken* (essentially equivalent to the adjectival form, *The broken toy*) from action verbs because the relevant operations emerge at an early stage in development. However, they are unable to produce passives with a by-phrase or understand mental experience verb passives such as *The toy was liked (by the baby)* because adjectival passives cannot be formed from such verbs (according to Borer & Wexler).

Berwick & Weinberg ((1985) and Weinberg (1987) take a "continuity" stand. They say that the principle and procedures that underlie passivization (and other constructions) have emerged in young children,

but that these operations are blocked because young children confuse the *-ed* participle of most passivized verbs with the past tense forming *-ed*. According to Berwick & Weinberg, children at first resolve this confusion in piecemeal fashion for action verb passives that they encounter in contexts which negate an active sentence reading of the utterance.

Both formulations preclude the possibility that acquisition of the passive is "semantically penetrable" in the sense that its acquisition could be influenced by semantic/cognitive distinctions about participants such as a distinction between animate and inanimate patients. However, two experiments (Lempert, 1989, in press) have shown that acquisition of agentive passives (those with a by-phrase) is easier with animate patients (as in *The baby was picked up by the clown*) than with static inanimate patients (as in *The chair was picked up by the clown*). This conclusion was based on production of passives. The present report demonstrates that it also holds for comprehension of passives.

Method

Summary of Methodology

The present report focuses on changes in comprehension of passives after preschool children received production training with either animate or static inanimate patients. The data from two separate experiments are combined in this report because the procedures, participants, and outcomes for production were essential comparable in both studies (except for certain procedural details which will be noted in this report). In both studies, potential participants (children in day care centers) received pretests for comprehension of reversible passive sentences (e.g., *The bear is kissed by the bunny; The monkey is pushed by the bear*); children who

behaved as if they did not understand the construction were assigned either to an animate (A) patient teaching group or to a static inanimate (SI) patient teaching group. In the teaching phase, children repeated the experimenter's passive sentence descriptions of drawings and tried to use the construction for other drawings. After this phase, they received post-teaching production and comprehension tests.

Comprehension tests in Experiment 1 consisted of 16 semantically reversible passive sentences which the children illustrated with toys. They also enacted the meaning of five active sentences. The number of passive sentences was reduced to 12 items in Experiment 2 (in order to maintain children's interest). The comprehension criterion for continued participation in Experiment 1 was 0 to 11 correctly interpreted passives (0% to 69%), and in Experiment 2, 0 to 8 sentences (0% to 67%). In both studies, a second version of the comprehension test was constructed by interchanging the agent and patient in each item. The two versions were administered in alternating order (each child received only one version).

Subjects. Participants in the teaching phase of Experiment 1 were 32 children ages 2-6 to 5-3 years, and in Experiment 2, 71 children, 2-8 to 4-8 years. Except for constraints imposed by age and comprehension, children were randomly assigned to animate (A) patient training and static inanimate (SI) patient training. In Experiment 1, the mean age of both groups was 3-8 (A-Patient range, 2-6 to 4-4, SI-Patient range, 3-0 to 5-3); mean comprehension for the A-Patient and SI-Patient groups respectively was 54% and 52% respectively. In Experiment 2, the respective mean ages of the A-Patient (n = 36) and SI-Patient (n = 35) groups were 3-6 (range, 2-8 to 4-8), and 3-7 (range, 2-10 to 4-7)

respectively. Mean comprehension was identical for both groups (37%).

Materials. Materials for the teaching phase consisted of two sets of 48 animate agent drawings. The set for the A-Patient group had animate patients (e.g., *Baby drops duck, lion licks cowboy*) and that for the SI-Patient group had inanimate patients (e.g., *Baby drops bottle, lion licks ice cream*). Not all verbs were identical in Experiments 1 and 2, but in both studies, eight different action verbs were used to construct 48 different drawings. Twenty-four were used for imitation, and 24 for production "probes". The post-teaching production materials consisted of new animate agent pictures, counterbalanced for animate and inanimate patients and for "old" (training) verbs and "new" verbs. There were 20 post-teaching production items in Experiment 1, and 32 in Experiment 2. (Details of the materials for Experiments 1 and 2 respectively are in Lempert (1989) and (In press) respectively.

Procedures. The teaching phase involved two sessions. In each session, children tried to repeat the experimenter's passive sentence descriptions of 12 drawings, and responded to 12 probes (interspersed in predetermined order among the imitation items). For probes, the experimenter told the child that "It's your turn to tell me the story in the new way". However, their active sentence and reversed passive sentences (e.g., The baby is dropped by the bottle) were not corrected.

In the post-teaching production phase, children started off with three imitation items used in the teaching phase. Then they were told that the experimenter had brought a new picture book, and were asked to tell the stories in the "new way". In Experiment 1, this phase usually required one session, and in Experiment 2, at least two sessions. Postteaching

comprehension tests were administered one to three days after the production tests, using the version that differed from the one administered in the preteaching phase.

Results and Discussion

Summary of Postteaching Production. The mean proportion successful elicitations of passives from A-Patient and SI-Patient children is summarized in Table 1 (for details, see Lempert, 1989, In press). Analysis of variance, followed by tests for simple effects on significant interactions revealed that in Experiment 1, A-Patient children produced significantly more passives to animate patient drawings than SI-Patient children ($p < .01$). Production of passives to inanimate patient drawings was comparable in the two groups. In Experiment 2, A-Patient children produced more passives to animate and to inanimate patient pictures ($p < .01$) than SI-Patient children. Analysis of individual data revealed that across both experiments, 21 A-Patient children as opposed to 10 SI-Patient children evidence knowledge of word order relations in passives ($p < .05$, two-tailed binomial test).

Insert Table 1 about here

In both experiments, A-Patient children produced significantly more post-teaching passives to animate than inanimate patients ($p < .01$). Patient animacy had no effect on postteaching passives in SI-Patient children in Experiment 1, but those in Experiment 2 showed a trend ($p < .05$) toward more passives to inanimate than animate patients. These findings imply that the pattern in A-Patient children does not simply

reflect the greater perceptual salience of animate beings (since this factor should also have resulted in the same production pattern in SI-patient children).

Comprehension. Across Experiments 1 and 2, a total of 45 A-Patient and 45 SI-Patient children agreed to postteaching comprehension tests. The respective mean pre- and post-teaching percent comprehension accuracy was respectively 43% and 61% for these A-Patient children, and respectively 42% and 48% for the SI-Patient children. A group x session mixed-design analysis of variance, followed by tests for main effects on the significant interaction ($p < .01$) revealed that the increase in comprehension was significant ($p < .01$) only in A-Patient children. Thus, comprehension as well as production benefitted more from experience with animate than inanimate patient passives. However, does this finding hold for individual children as well as for the averaged data?

Analysis of comprehension changes in individual children was done separately for children who had performed randomly on comprehension pretests, and for those who had consistently reversed on pretests. A-Patient and SI-Patient children in each of the two preteaching categories were categorized in one of following three postteaching comprehension categories on the basis of their comprehension posttest; "Correct", "Random", and "Reverse" (explained below).

Since there were 16 passive sentence comprehension items in Experiment 1, above chance accuracy ("Correct") in this experiment was defined as 75% to 100% accuracy, chance accuracy ("Random") as 31% to 69% accuracy, and consistent reversals ("Reverse") as 0% to 25% accuracy. In the case of Experiment 2 (12 items), the Correct category ranged from 83% to 100%

accuracy, the Random category from 25% to 75%, and the Reverse category from 0% to 17% accuracy. Table 2 shows the number of A- patient and SI-Patient children in each postteaching comprehension category, as a function of their preteaching comprehension category (Random or Reverse)

Insert Table 2 about here

The postteaching distributions for children whose initial comprehension was at chance level differed significantly for A-Patient and SI-Patient children ($X^2 = 6.42$, $df = 2$, $p < .025$). Inspection of the data for these children in Table 2 indicates that 56% of A-Patient children as opposed to 27% of SI-Patient children behaved as if they understood passives on postteaching tests. The postteaching distributions for A- and SI-Patient children who had consistently reversed on pretests did not differ significantly ($X^2 = 2.41$, $df = 2$, $p > .05$). However, the total number of A-Patient children in the Correct category at postteaching (n=20) exceeded the number of SI-Patient children (n=10), ($p = .056$, two-tailed binomial test).

Further analysis revealed that the effect of A-Patient training tended to differ according to whether children showed a Random or Reverse preteaching comprehension pattern ($X^2 = 6.41$, $df = 2$, $p < .025$). Inspection of the relevant distributions reveals that whereas the trend is for children in the (preteaching) Random category to move into the Correct category, those in the Reverse category tend to move into the Random category. If the Reverse category is viewed as composed of children who interpret passives as if they were actives (i.e., assign

agent to the first noun), then it appears that most of these children at least recognized that word order relations in passives and actives differ after production training. A similar analysis for SI-patient children revealed comparable postteaching distributions for children in the pre-teaching Random and Reverse categories ($p > .05$).

Summary and Conclusions

To summarize, children taught with animate patients showed better knowledge of passives in post-teaching production tests than those taught with inanimate patients. Since the postteaching stimuli were identical for both groups, the production differences must be attributed to patient animacy in the teaching phase. Specifically, animate patients facilitated learning word order relations in passives, as assessed by production of the form. The fact that production training with animate patients also facilitated comprehension of word order relations in passives demonstrates that acquisition of the construction is semantically penetrable, specifically, acquisition is sensitive to the semantic/cognitive distinctions that children make between animate and inanimate beings.

The present findings argue against Borer & Wexler's (1987) proposal that the procedures that underlie passivization are at children's disposal when a component or components of the language faculty mature. This model could explain the findings only if the rate of brain development differend in children assigned to the two teaching groups (which is evidently implausible).

The current findings do not necessarily conflict with Berwick & Weinberg's (1985; Weinberg, 1987) argument that the (purportedly) innately available computations that underlie passivization are blocked by

children's misconceptions about the morphology of passives. However, while children evidently need to learn the implications of the morphology of passives, why should animate patients facilitate this process?

Maratsos, Fox, Becker & Chalkley (1985) and Pinker, Lebeaux & Frost (1987) believe that that there is a semantic prototype for the passive, and that this prototype consists of actional events in which an animate agent causes a change in the state or location of another being (the patient). That is, they suppose that the semantic core for the construction consists of situations in which one entity is clearly affected by the action of another entity. They do not say why such situations should be prototypical, but presumably, since such change is perceptually salient, the effect on the patient is foregrounded and the cause of the change recedes into the "background" of the speaker's attentional field.

The present findings are explicable in these terms if it is supposed that sentient beings (i.e., animates) are "better" examples of patients than inanimates in the sense that animates are more visibly affected than inanimates by actions such as *push*, *drop*, and *pat*. As a result, children might give more attention to the effect of actions on animate than inanimate beings (and relatively less attention to the agent in the first than second situation); the difference in attentional priorities might in turn facilitate recognition that the first noun in passives encodes the "done-to" entity. But if animate beings are accorded the subject position in passives because they are conceptualized as better instances of patients, and conversely, protypically accorded the subject position in actives because they are conceptualized as the best instances of agents,

then it would appear that they are prototypes for the subject category. More importantly, if the cognitive distinctions that children make between animate and inanimate beings constrain language learning, then it becomes incorrect to suppose that we can fully understand this process in terms of the functioning of a purportedly autonomous, language-specific faculty.

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Table 1

Mean proportion successful elicitations of passives after production training with animate (A) versus static inanimate (SI) patients

	Postteaching Picture Type	
	Animate Patient	Inanimate Patient
Experiment 1		
A-Patient Group (n = 15)	.55	.33
SI-Patient Group (n = 14)	.26	.26
Experiment 2		
A-Patient Group (n = 35)	.46	.38
SI-Patient Group (n = 35)	.22	.28

Note: Data are based on number of children who agreed to postteaching production tests.

Table 2

Changes in children's comprehension [a]categories after production training with animate (A) versus static inanimate (SI) patients (Data from Experiments 1 and 2 are combined)

	Posttraining			
Pretraining	Correct	Random	Reverse	Total
Random				
A-Patient Group	18 (56%)	11 (35%)	3 (9%)	32
SI-Patient Group	10 (27%)	19 (49%)	8 (21%)	37
Mean Age (Months)	*45.9*	*43.6*	*44.2*	
Reverse				
A-Patient Group	2 (15%)	8 (62%)	3 (23%)	13
SI-Patient Group	0 (0%)	4 (50%)	4 (50%)	8
Mean Age (Months)	*38.0*	*41.1*	*40.7*	

[a]***Note:***

"Correct" = above chance accuracy, two-tailed binomial test, $p < .05$ (Experiment 1, 75% - 100%, Experiment 2, 83% - 100%)
"Random" = chance accuracy (Experiment 1, 31% - 69%, Experiment 2, 25% - 75%)
"Reverse"= accuracy significantly below chance (Experiment 1, 0%-25%, Experiment 2, 0%-17%)